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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/448,276	11/24/1999	YUN BOK LEE	8733.20024	4858

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MCKENNA LONG & ALDRIDGE LLP
1900 K STREET, NW
WASHINGTON, DC 20006

EXAMINER	
RUDE, TIMOTHY L	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 06/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/448,276	LEE ET AL.	
	Examiner	Art Unit	
	Timothy L Rude	2871	

-- The MAILING DATE of this communication appears on the cover sheet with th correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claims

1. Claims 2, 12, 13, 15, 16, 30, and 31 are amended.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-5, 7, 11, 14, 17-33, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al (Yamada) USPAT 6,344,883.

As to claims 1 and 30, Yamada discloses [Figures 10A-10D (col. 19, line 40 through col. 27, line 35] a multi-domain liquid crystal display device comprising: first and second substrates facing each other [32 and 34]; a liquid crystal layer [42] between said first and second substrates; a pixel electrode [31] in said pixel region; and a common electrode [33] on said second substrate; a dielectric frame, [36, OMR83, col. 26, lines 45-62] in a region other than a region where said pixel [pixel region in 10C] electrode is formed, said dielectric frame distorting electric field applied to said liquid

crystal layer [inherent to dielectric material, OMR83], and an alignment layer, 38a and 38b, on at least one substrate between said first and second substrates.

Figures 10A-10D of Yamada do not explicitly disclose the gap between neighboring pixel electrodes, a plurality of gate bus lines arranged in a first direction on said first substrate and a plurality of data bus lines arranged in a second direction on said first substrate to define a pixel region, however these are obviously well known in the art as they are needed to control the individual pixel electrodes to achieve proper display performance. Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Yamada with the plurality of gate bus lines arranged in a first direction on said first substrate and a plurality of data bus lines arranged in a second direction on said first substrate to define a pixel region of Yamada.

As to claim 2, Yamada discloses [col. 32, lines 22-60] a color filter layer and an over coat layer, 90a, on said color filter layer.

As to claim 3, Yamada discloses [col. 26, lines 45-62] a dielectric frame patterned from resist material OMR83.

As to claim 4, Yamada discloses [Figures 12A and 12B, col. 25, lines 25-39] a dielectric frame that maintains uniformly a gap between said first and second substrates by supporting the spacers, 65, at a uniform height.

As to claim 5, Yamada discloses [col. 26, lines 45-62] a dielectric frame made from resist material OMR83 wherein the dielectric frame tilts the molecules of said liquid crystal layer, thereby confirming OMR83 to have a different dielectric constant from that of said liquid crystal layer.

As to claim 7, Yamada discloses [col. 26, lines 45-62] a dielectric frame including photosensitive materials [OMR83].

As to claims 11 and 14, Yamada discloses [Figures 10A-10D, col. 19, line 40 through col. 27, line 35] the multi-domain liquid crystal display device according to claim 1, wherein said pixel electrode [col. 20, lines 5-9] has an electric field inducing window, 35, inside of itself.

As to claim 17, Yamada discloses the use of polyimide-type materials for the homeotropic alignment layer [Applicant's passivation layer].

As to claim 18, Yamada does not explicitly disclose a passivation layer of a material selected from the group consisting of silicon nitride and silicon oxide. However, the use of these materials for a passivation layer is well known in the art of liquid crystals due to their good performance as insulating materials.

As to claims 19 and 20, Yamada discloses the use of pixel and common electrodes made of ITO [col. 25, lines 25-32].

As to claim 21, Yamada discloses [Figures 10A-10D, col. 19, line 40 through col. 27, line 35] the multi-domain liquid crystal display device according to claim 1, wherein said pixel region is divided into at least two portions [Figure 10D], liquid crystal molecules in said liquid crystal layer in each portion being driven differently from each other.

As to claim 22, Yamada discloses in Figure 10B and as prior art in Figure 30B a multi-domain liquid crystal display device wherein the alignment layer is divided into at least two portions, liquid crystal molecules in said liquid crystal layer in each portion being aligned differently from each other.

As to claim 23, Yamada discloses as prior art [col. 2, lines 63-67] a multi-domain liquid crystal display device wherein at least one portion of said alignment layer is alignment-treated.

As to claim 24, Yamada discloses as prior art [col. 2, lines 53-57] a multi-domain liquid crystal display device wherein all portions of said alignment layer are non-alignment-treated.

As to claim 25, Yamada discloses as prior art the use of a liquid crystal layer including liquid crystal molecules having positive dielectric anisotropy [col. 2, lines 22-47].

As to claim 26, Yamada discloses [col. 6, lines 56-64] the multi-domain liquid crystal display device according to claim 1, wherein said liquid crystal layer includes liquid crystal molecules having negative dielectric anisotropy.

As to claim 27, Yamada discloses [col. 17, lines 47-50] a negative uniaxial film on at least one substrate.

As to claim 28, Yamada discloses [col. 17, lines 50-58] a negative biaxial film on at least one substrate.

As to claim 29, Yamada discloses [col. 26, line 65 through col. 27, line 7] the use of a liquid crystal layer including chiral dopants.

As to claim 31, Yamada discloses [col. 32, lines 22-60] a color filter layer and an over coat layer, 90a, on said color filter layer.

As to claim 32, Yamada discloses [col. 26, lines 45-62] a dielectric frame made from resist material OMR83 wherein said dielectric frame is therefore patterned.

As to claim 33, Yamada discloses [col. 26, lines 45-62] a dielectric frame made from resist material OMR83 wherein the dielectric constant of said dielectric frame is therefore different than that of said liquid crystal layer.

As to claim 35, Yamada discloses [col. 26, lines 45-62] a dielectric frame including photosensitive materials [OMR83].

3. Claims 6, 8-10, 34, and 36-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada, in view of Horie et al (Horie) USPAT 6,061,117.

As to claim 6 and 34, Yamada does not explicitly disclose the multi-domain liquid crystal display device according to claims 1 and 30 respectively, wherein said dielectric frame shields light leakage from a region other than said pixel region.

Horie teaches [col. 7, lines 4-15] the use of a black dye in the dielectric frame to provide light shielding. Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Yamada with the light shielding frames of Horie.

As to claim 8 and 36, Yamada does not explicitly disclose the multi-domain liquid crystal display device according to claims 1 and 30 respectively, wherein said dielectric

frame includes a material selected from the group consisting of BCB (BenzoCycloButene) and photoacrylate.

Horie teaches [col. 18, lines 5-32] the use of photocurable resins including acrylic acid and acrylates having a long-chain alkyl group with three or more carbon atoms or having a benzene ring. Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Yamada with the photoacrylate of Horie.

As to claims 9 and 37, Yamada does not explicitly disclose the multi-domain liquid crystal display device according to claims 1 and 30 respectively, wherein said dielectric frame includes mixture of polyimide and carbon black.

Horie teaches [col. 15, lines 38-50] the use of polyimide for the frame [convex portion] and Horie teaches the use of a black dye [col. 7, lines 4-15].

Horie does not explicitly disclose the use of carbon black as the dye. However, the use of carbon black as a dye for light shields is well known in the art of liquid crystals. Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Yamada with the carbon black dyed light shielding frames of Horie.

As to claims 10 and 38, Yamada discloses the use of acrylic resin [acrylic negative resist, col. 35, lines 2-10] for the dielectric frame. Horie discloses the use of a black dye in the frame for light shielding [col. 7, lines 4-15].

Yamada does not explicitly disclose the use of carbon black as the dye. However, the use of carbon black as a dye for light shields is well known in the art of liquid crystals to absorb light without fading. Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the acrylic LCD frames of Yamada with the carbon black dye of Horie.

4. Claims 12, 13, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art (APA) in view of Yamada, as applied above, and further in view of Murai et al (Murai) USPAT 5,963,290.

As to claims 12, 13, 15, and 16, APA in view of Yamada discloses the device as claimed except wherein said passivation layer has an electric field inducing window inside of itself, wherein said gate insulator has an electric field inducing window inside of itself, wherein said color filter layer has an electric field inducing window inside of itself, and/or, wherein said over coat layer has an electric field inducing window inside of itself.

Murai teaches in Figure 2 that the use of an aperture [Applicant's field inducing window] is known in the art to be suitable for the intended purpose of causing the liquid crystal molecules to tilt in different directions thereby improving the viewing characteristics [col. 3, lines 1-33]. Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Yamada with the passivation layer with an electric field inducing window inside

of itself, said gate insulator with an electric field inducing window inside of itself, said color filter layer with an electric field inducing window inside of itself, and/or, said over coat layer with an electric field inducing window inside of itself of Yamada as a structure having art-recognized suitability for the intended purpose of causing the liquid crystal molecules to tilt in different directions thereby improving the viewing characteristics.

Response to Arguments

5. Applicant's arguments filed 20 January 2004 have been fully considered but they are not persuasive.

Applicant's ONLY arguments are as follows:

(1) None of the cited references teach a dielectric frame in a region other than a region where said pixel electrode is formed.

(2) Yamada Figs 10A-10D show the convex portion, 36, is on the pixel electrode (rather than in a region other than a region where the pixel electrode is formed).

(3) None of the cited references teach a dielectric frame surrounding a pixel region that is defined by the gate bus line and the data bus line.

Examiner's responses to Applicant's ONLY arguments are as follows:

(1) and (2) It is respectfully pointed out that the illustrations of Yamada are unfortunately poor with respect to electrode details. However, it is clear from the text of Yamada that the frames [convex portions, 36] surround the pixel area. Please consider embodiment 1 upon which the subsequent embodiments in part rely (col. 13, lines 25-27 and lines 36-46). Also, please note that it is well known in the art that pixel electrodes simply must be electrically isolated from neighboring pixel electrodes, most commonly by a gap, despite the illustrations of Yamada. Further, structures, 15, conventionally run along said gap between pixel electrodes, 13, as is indicated by Applicant's admitted prior art (APA).

(3) It is respectfully pointed out that APA discloses a pixel region that is defined by the gate bus line and the data bus line and Yamada teaches [with motivation to combine] a frame, 36, that surrounds the pixel region per rejections above and would necessarily be at least in regions other than a region where said pixel electrode is formed. Please note that the present claim language does not preclude portions of the dielectric frame from being in regions where the pixel electrodes *are* formed. In so far as Applicant has not argued examiner's rationale for rejection of dependent claims, Applicant has acquiesced.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy L Rude whose telephone number is (571) 272-2301. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

tlr

Timothy L Rude
Examiner
Art Unit 2871

James A Dudek
Primary Examiner
Art Unit 2871